FURTHER EXPLANATIONS DESIRED.

In a recent communication on "The stars and the weather" to Leslie's Weekly, Prof. Simon Newcomb, the eminent astronomer, says:

> The fact is that the extraordinary changes of weather which we experience are produced almost entirely by the accidental meeting of currents of hot, cold, or moist air. High above the earth the air is in constant motion—currents or streams moving with great swiftness around the earth, in some latitudes or seasons in a westerly and in others in an easterly direction. Through the heat of the sun, water is constantly evaporated from the ocean and to a less extent from the land. The vapor rising up mixes in with the air currents and condenses into clouds which are carried along with the winds. The currents vary from time to time, and when a cold and a wet current come together we have rain. The sun shining on the earth heats it up, and the warm earth heats the air in contact with it and thus expands it; the expanded hot air tends to rise and as it does so, the air from around flows down and in and takes its place. By this change electricity is developed and thus we may have a thunderstorm. If the winds are blowing in opposite directions near the place where the volume of air rises, we may have a whirlwind or a cyclone.
>
> Thus it is that the weather is continually changing over the greater part of the earth through the varying currents of air, without the direct action of any astronomical cause. It is true that the whole movement is kept up by the heat of the sun; but there are, so far as we know, no changes in this heat to produce changes of weather.

We think that the above quotation gives altogether too much prominence to the accidental meeting and mixture of currents of cold air and moist air. The fact that such mixtures will not produce any appreciable rain was long since demonstrated and this ancient theory was banished from reputable works on meteorology. The development of electricity by the rise of hot air and the descent of cold air is, we believe, a new thought in the physics of the atmosphere. The formation of a cyclone or a whirlwind as a consequence of winds blowing in opposite directions is another theory long since abandoned: only the smaller dust whirls are formed in this way and often not even those. "Accidental" phenomena are entirely unknown in meteorology. Everything moves according to natural laws; if events seem to be accidental it is only because of our ignorance of the workings of those laws.

In the course of a long acquaintance with this eminent astronomer we have never known him to fall into serious error in a matter of fundamental scientific principles, and as his beautiful popular style of writing contributes powerfully to the dissemination of sound knowledge, we venture to hope that he will publish some further explanation of his views for the benefit of the observers of the Weather Bureau and the readers of the MONTHLY WEATHER REVIEW.

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. J. S. Hazen, Observer Weather Bureau, Springfield, Mo., reports that he delivered two lectures during the month. One was before teachers attending the county institute, at Springfield, and the other before teachers attending the summer sessions of the Springfield Normal School.

Both lectures were devoted mainly to a discussion of the use of weather maps in schools.

CORRIGENDA.

MONTHLY WEATHER REVIEW for May, 1901, page 214, column 2, list of micrographs, etc., supply the following dates:

17. 1901, February 5.
18. 1898, January 5.
24. 1893, February 16.
25. 1892, January 5.
26. 1899, December 14.

MONTHLY WEATHER REVIEW for July, 1901, make the following corrections:

In note at bottom of page 306, column 1, lines 1 and 6, for "Pockles" read "Pockels."

Page 309, column 1, line 5 from bottom, for "east" read "west."

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

CHARACTERISTICS OF THE WEATHER FOR AUGUST

The month of August was characterized by (1) an unusually rapid movement of the highs and lows during the early part of the month, (2) a severe and destructive storm on the Gulf coast, and (3) an unusually heavy rainfall along the eastern slopes of the Appalachians. In other respects, the month was fairly typical of average August weather.

Temperature was generally above the average in all parts of the country, save over some portions of the South Atlantic States and along the immediate Pacific coast. The hot weather of the preceding month continued into August, and maximum temperatures ranging from 100° to 110° were recorded at various points in the Missouri and middle Mississippi valleys.

The rapid movement of the highs and lows across the country, which continued until about the 15th of the month, was very remarkable for the summer season. The winds were not especially boisterous and the rainfall accompanying the lows was not heavy.

PRESSURE.

The distribution of monthly mean pressure is graphically shown on Chart IV and the numerical values are given in Tables I and VI.

The distribution of monthly mean pressure differed from that of a normal month, mainly in the relative position of the south Atlantic high, the crest of the high appearing somewhat farther to the northward than usual. There was also a western extension covering the Lake region. In Tennessee and the central Gulf States, a portion of the territory usually occupied by the south Atlantic high, pressure was relatively low.

As compared with the previous month, pressure rose from .05 to .15 inch over the northern two-thirds of the country, except on the immediate Pacific coast. The maximum rise was in that part of the country where mean pressure was unusually low during July. Pressure was below the normal in the lower Ohio and lower Mississippi valleys, over Texas and a portion of the middle Pacific coast; elsewhere it was above normal by amounts ranging from .01 to .10 inch.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

The month as a whole must be classed as warm, temperature being from 2° to 4° on the average above the normal for the season, except in southern Georgia and Florida, and along the immediate Pacific coast, where slight negative departures were recorded. The hot weather of the preceding month continued into August and maximum temperatures of from 100° to 110° were registered in the Missouri and middle Mississippi valleys and the Southwest, during the first half of the month.

The average temperature for the several geographic districts, and the departures from the normal values are shown in the following table:

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	68.0	+ 1.4	— 0.9	— 0.1
Middle Atlantic	12	75.0	+ 1.8	+ 0.2	0.0
South Atlantic	10	79.1	+ 0.5	—10.1	— 1.3
Florida Peninsula	7	80.3	— 1.0	—18.5	— 1.7
East Gulf	7	79.9	+ 0.4	— 8.0	— 1.0
West Gulf	7	83.3	+ 2.7	+ 6.8	+ 0.8
Ohio Valley and Tennessee	12	75.9	+ 1.0	— 3.2	— 0.4
Lower Lake	8	71.3	+ 1.9	+ 1.0	+ 0.1
Upper Lake	9	67.7	+ 2.0	+10.1	+ 1.3
North Dakota	8	67.7	+ 1.2	+25.9	+ 3.2
Upper Mississippi Valley	11	75.2	+ 2.4	+15.5	+ 1.9
Missouri Valley	10	76.3	+ 3.3	+27.1	+ 3.4
Northern Slope	7	70.4	+ 2.5	+19.4	+ 2.4
Middle Slope	6	77.9	+ 3.3	+13.6	+ 1.7
Southern Slope	6	80.9	+ 2.9	+ 6.9	+ 0.9
Southern Plateau	15	76.4	+ 0.3	+ 3.5	+ 0.4
Middle Plateau	9	70.6	+ 0.9	+11.1	+ 1.4
Northern Plateau	10	71.4	+ 4.0	+11.8	+ 1.5
North Pacific	9	63.3	+ 1.2	— 7.5	— 0.9
Middle Pacific	5	64.1	— 0.7	— 2.9	— 0.4
South Pacific	4	72.0	+ 0.6	+ 3.9	+ 0.5

In Canada Prof. R. F. Stupart says:

The temperature was from 1° to 4° above average over the Lake region of Ontario, also to the same amount over a large portion of Nova Scotia and in Prince Edward Island. In British Columbia and Alberta it was just above average, whilst throughout Quebec and all the remaining portions of Canada it was from average to 2° below.

PRECIPITATION.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	3.52	88	—0.5	+ 0.5
Middle Atlantic	12	6.98	152	+2.4	— 0.2
South Atlantic	10	7.22	109	+0.6	+ 1.7
Florida Peninsula	7	9.09	136	+2.4	+ 5.8
East Gulf	7	6.97	130	+1.6	+ 1.0
West Gulf	7	2.74	75	—0.9	—11.0
Ohio Valley and Tennessee	12	4.95	139	+1.4	— 7.0
Lower Lake	8	3.98	134	+1.0	— 1.0
Upper Lake	9	1.86	61	—1.2	— 4.2
North Dakota	8	2.05	95	—0.1	+ 0.5
Upper Mississippi Valley	11	1.42	47	—1.6	— 7.8
Missouri Valley	10	2.11	65	—1.1	— 7.0
Northern Slope	7	1.07	86	—0.2	+ 0.9
Middle Slope	6	1.67	63	—1.0	— 5.3
Southern Slope	6	1.83	70	—0.8	— 2.9
Southern Plateau	15	2.10	124	+0.4	+ 1.3
Middle Plateau	9	1.54	285	+1.0	+ 0.8
Northern Plateau	10	0.13	30	—0.3	— 1.9
North Pacific	9	0.22	27	—0.6	0.0
Middle Pacific	5	0.02	100	0.0	— 0.8
South Pacific	4	0.07	100	0.0	+ 1.9

The month as a whole was one of abundant rainfall, although seven of the twenty-one districts into which the country is divided had less than 75 per cent of the normal amount. The districts having more than the seasonal average were the Middle Atlantic States, South Atlantic States, Florida Peninsula, eastern Gulf, Ohio valley and Tennessee, lower Lake region, Southern Plateau and the Middle Plateau. The rainfall on the Middle Plateau was especially remarkable, the total amount being 285 per cent of the normal. Especially heavy rains fell in the mountain regions of western North Carolina and southwestern Virginia. In fact, the western two-thirds of North Carolina and the eastern third of Tennessee, including portions of South Carolina and northern Georgia, received over 10 inches of rain during the month. Very heavy rains also fell in eastern Pennsylvania and southern New York and New England, while in the middle and upper Mississippi and in the Missouri valleys the total fall was slightly over 50 per cent of the normal.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 19, 23, 28. Arizona, 3, 4, 11, 12, 15, 27. Arkansas, 16. California, 4, 6, 12, 16, 17, 18. Colorado, 3, 4, 8, 10, 11, 12, 14, 15, 16, 20, 27, 28, 29, 30. Florida, 30. Georgia, 27. Idaho, 2, 20. Indiana, 26, 30. Iowa, 13, 14. Kansas, 11, 13, 20, 24, 25, 29, 30. Louisiana, 26, 28. Michigan, 6, 29. Missouri, 14, 15. Montana, 2, 15. Nebraska, 9, 10, 12, 13, 14, 24, 29. Nevada, 2, 6, 9, 15, 17, 18. New Jersey, 15. New Mexico, 8, 10, 16, 18, 19, 24, 30. New York, 8, 9. North Carolina, 1, 26, 31. North Dakota, 10, 12, 20. Ohio, 27, 29, 30, 31. Oregon, 8, 10, 18, 25, 26. Pennsylvania, 9, 31. South Dakota, 6, 9, 10, 14, 28, 29. Tennessee, 18, 26. Utah, 1, 3, 4, 10, 27. West Virginia, 20, 26. Wyoming, 8, 23, 24, 27, 30.

In Canada.—Professor Stupart says:

The rainfall was largely below the average over British Columbia and throughout the Dominion as far east, and including the Lake Superior region, also in eastern Quebec and all parts of the Maritime Provinces. Over western Quebec the average was exceeded by an inch to an inch and a half. In Ontario, south of the Ottawa River, and including the Georgian Bay and lower Lake region, the distribution of rain was in many respects remarkable, excessive and deficient amounts occurring in contiguous districts, owing to local thunderstorms. Along the north shore of Lake Erie and the west and south shores of Lake Huron there was very little rain during the month; less than half an inch in some localities. In Peterboro, Northumberland, Hastings, and Prince Edward counties the rainfall was also very light, but elsewhere there was, as a rule, a considerable quantity. The chief deficiencies reported in Canada were: Barkerville, 2.2 inches; Edmonton, 2.6 inches; Manitoba, 1.4 to 1.8 inches; White River, 2.1 inches; Chatham, N. B., 2.3 inches; Sydney, 2.0 inches; and the chief excesses, Woodstock, Ont., 3.2 inches; Orangeville, Ont., 3.5 inches; Aurora, Ont., 2.6 inches.

HUMIDITY.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	85	+ 3	Missouri Valley	60	— 7
Middle Atlantic	80	+ 5	Northern Slope	59	+ 8
South Atlantic	84	+ 2	Middle Slope	59	2
Florida Peninsula	81	0	Southern Slope	56	3
East Gulf	81	+ 1	Southern Plateau	45	3
West Gulf	71	— 3	Middle Plateau	44	+12
Ohio Valley and Tennessee	76	+ 5	Northern Plateau	41	2
Lower Lake	75	+ 5	North Pacific Coast	70	6
Upper Lake	77	+ 3	Middle Pacific Coast	63	5
North Dakota	69	+ 6	South Pacific Coast	66	+ 3
Upper Mississippi	64	— 6			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which

also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Mobile, Ala	15	60	se.	Pensacola, Fla	15	70	sw.
Mount Tamalpais, Cal.	16	53	nw.	Bridgetown, Bar	20	52	s.

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.6	+0.6	Missouri Valley	3.3	−0.8
Middle Atlantic	5.6	+0.6	Northern Slope	3.0	−0.7
South Atlantic	5.5	+0.3	Middle Slope	3.8	0.0
Florida Peninsula	6.0	+0.6	Southern Slope	3.7	−1.1
East Gulf	5.4	+0.5	Southern Plateau	2.9	−0.5
West Gulf	3.8	−0.6	Middle Plateau	3.6	+1.4
Ohio Valley and Tennessee	5.1	+0.6	Northern Plateau	3.1	+0.1
Lower Lake	5.4	+0.9	North Pacific Coast	3.3	−0.6
Upper Lake	4.9	+0.1	Middle Pacific Coast	4.1	+1.3
North Dakota	3.7	−0.2	South Pacific Coast	2.7	+0.2
Upper Mississippi	3.5	−0.6			

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 5,892 thunderstorms were received during the current month as against 5,930 in 1900 and 7,732 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 22d, 286; 20th, 282; 23d, 280.

Reports were most numerous from: Colorado, 350; New York, 273; Nebraska, 257.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: 27th to September 2d.

In Canada: Thunderstorms were reported as follows: Halifax, 26; Yarmouth, 25; Charlottetown, 1, 11, 16; Father Point, 15; Quebec, 3, 8, 23; Bissett, 15, 16; Ottawa, 22; Kingston, 30, 31; Toronto, 8, 15, 20, 22, 23, 26, 30, 31; White River, 12; Port Stanley, 15, 19, 23, 30; Parry Sound, 10, 15, 22, 30; Port Arthur, 7, 12, 13, 22, 28; Winnipeg, 10, 28; Minnedosa, 17; Qu'Appelle, 22, 28; Swift Current, 10, 27; Banff, 2, 25; Battleford, 4, 5, 8; Barkerville, 8.

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J HENRY, Professor of Meteorology.

For description of tables and charts see page 320 of REVIEW for July, 1901.